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RECENT FORAMINIFERA FROM THE ATLANTIC COAST OF SOUTH AMERICA

BY

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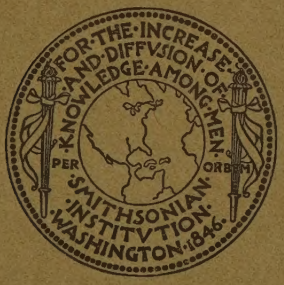

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RECENT FORAMINIFERA FROM THE ATLANTIC COAST OF SOUTH AMERICA

By Joseph A. Cushman and Frances L. Parker

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This is the third of a series of papers on the recent foraminifera from the collections made by Dr. Waldo L. Schmitt, of the United States National Museum, on his trip about South America under the auspices of the Walter Rathbone Bacon scholarship of the Smithsonian Institution. Those from Juan Fernandez have already been studied and the results published,[1] as well as those from the west coast of South America.[2]

D'Orbigny's memoir on the foraminifera of his voyage around South America, published in 1839, contained figures and descriptions of many new species that have not been recorded or referred to since that date. Very little has been added to the knowledge of the foraminiferal fauna of the South American coast, including the Falkland Islands. The *Challenger* occupied a few stations along the eastern coast of South America, but mostly in the offshore waters. The paper by Brady, Parker, and Jones on the foraminifera of the Abrohlos Bank, together with the records given by Pearcey, furnished most of the few additional records from the region. Flint studied a very few of the *Albatross* collections made on the trip around South America, and Heron-Allen and Earland are now publishing papers on the fauna of the Falkland Islands collected by the *Discovery* Expedition.

The relations of the fauna are interesting. Our stations from off Brazil, especially the harbor of Rio de Janeiro, show that the fauna at that point is essentially a West Indian one, and most of the species are to be found in d'Orbigny's work of 1839 on the West Indies, or in more recent works on the fauna of the same region. The stations to the south along the coast of Argentina and the shallow water of the Falklands give a cold-water fauna, which is not closely

[1] Cushman and Wickenden, Proc. U. S. Nat. Mus., vol. 75, art. 9, 1929.
[2] Cushman and Kellett, Proc. U. S. Nat. Mus., vol. 75, art. 25, 1929.

related to that of Brazil, but which has numerous species recorded by d'Orbigny in 1839 from this same region, and others evidently extending around Cape Horn. These are identical with species described by d'Orbigny from the west coast. The faunas of the two sides of South America are, however, for the most part quite different.

In order to avoid repetition, reference is given to the various parts of United States National Museum Bulletin 104 on the Atlantic foraminifera, where complete description and synonymy of the various species will be found. Nearly all the species are already known from earlier works, but three of the forms are here described as new. In order that workers may have a visual record of the forms of this region, nearly all the species are illustrated. Most of those not figured here, such as the species of *Elphidium*, are already figured in Bulletin 104, some of them from this same material. The figures are from drawings made by Miss Margaret S. Moore. The data for the stations represented are as follows:

Station 1. Ilha Paqueta, Rio de Janeiro Harbor, Brazil, August 17, 1925; tidal flats.
2. Nictheroy, Rio de Janeiro Harbor, Brazil, August 22, 1925.
8. Off Ilha Govenador, Rio de Janeiro Harbor, Brazil, August 2, 1925; boat dredge, 3 fathoms, muddy, shelly bottom.
80. Port Stanley, Falklands, February 23, 1927; boat dredge, 1 to 2 fathoms, mud and broken shell bottom.
85. Below Port Darwin, Choisel Sound, Falklands, March 2, 1927; bottom sampler, 4 fathoms.
87. Off lower jetty, Port Howard, Falklands, March 4, 1927; bottom sampler, 4 fathoms.
95. Narrows between Port Stanley and Port William, Falklands, March 20, 1927; bottom sampler, 3 to 4 fathoms, sandy bottom.
97. Port William, Falklands, March 20, 1927; oyster dredge, 8 to 10 fathoms, weedy bottom.
105. Off light, north shore Port William, Falklands, April 9, 1927, oyster dredge, 14 to 15 fathoms, weedy, shelly bottom.
123. Anchorage, St. Julian, Argentina, May 6, 1927; bottom sampler.
124. Anchorage, Puerto Deseado, Argentina, May 7, 1927; bottom sampler.

Family SACCAMMINIDAE

Genus PROTEONINA Williamson, 1858

PROTEONINA DIFFLUGIFORMIS (H. B. Brady)

PLATE 1, FIGURE 1

Proteonina difflugiformis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 1, p. 48, 1918.

The specimens of this species are very common at station 85 only, in 4 fathoms, Choisel Sound, Falklands. They are typical, however, and one of them is here figured.

Family AMMODISCIDAE

Genus GLOMOSPIRA Rzehak, 1888

GLOMOSPIRA GORDIALIS (Jones and Parker)

PLATE 1, FIGURE 2

Glomospira gordialis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 1, p. 99, 1918.

This species is common only about the Falkland Islands in our material and was not found at any of the stations along the eastern coast of South America. It is subject to the usual variations, especially in the plane of coiling of the chambers.

Genus TOLYPAMMINA Rhumbler, 1895

TOLYPAMMINA VAGANS (H. B. Brady)

PLATE 1, FIGURE 3

Tolypammina vagans CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 1, p. 91, 1918.

There are a few specimens in the shallow water from the Falkland region, but the species does not occur at any of the stations to the north.

Family LITUOLIDAE

Genus HAPLOPHRAGMOIDES Cushman, 1910

HAPLOPHRAGMOIDES CANARIENSIS (d'Orbigny)

PLATE 1, FIGURES 4 *a, b*

Haplophragmoides canariensis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 2, p. 38, 1920.

At some of the stations about the Falklands this species is very common and seems to be typical of the species as figured by d'Orbigny. It is much closer to his type figures than are many of the later figures given by other authors and referred to his species.

Family MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny, 1826

QUINQUELOCULINA FUSCA H. B. Brady

PLATE 1, FIGURES 9 *a–c*

Quinqueloculina fusca CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 23, 1929.

It might be supposed that this arenaceous species would be most abundant in the cold water toward the south, but the only specimens of arenaceous Miliolidae found belong to this species, which occurs only at station 1, in Rio de Janeiro Harbor. None of the other arenaceous species so common in the West Indian region occurs here, so far as our material shows.

QUINQUELOCULINA CANDEIANA d'Orbigny

PLATE 1, FIGURES 10 *a–c*

Quinqueloculina candeiana CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 27, 1929.

The only previous records for this species are those by d'Orbigny, from the West Indian region, and later from the Tortugas and Porto Rico. It is not surprising, therefore, to find the species in its typical form at stations 1 and 2 in Rio de Janeiro Harbor.

QUINQUELOCULINA LAMARCKIANA d'Orbigny

PLATE 1, FIGURES 7 *a–c*

Quinqueloculina lamarckiana CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 26, 1929.

This species was found only at stations 1 and 8. It is common in the West Indian region but is also widely distributed elsewhere. Our specimens fit d'Orbigny's species, and it is apparent that his *Quinqueloculina magellanica* is also a synonym of this species, probably representing a southward expansion of it into colder water.

QUINQUELOCULINA ISABELLEI d'Orbigny

PLATE 1, FIGURES 11 *a–c*; PLATE 2, FIGURES 2 *a–c*

Quinqueloculina isabellei D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminfères," p. 74, pl. 4, figs. 17–19, 1839.

Test about twice as long as broad but compressed, in end view the lateral chambers projecting only slightly beyond the two outer chambers, which are more or less in one plane; chambers distinct, inflated; sutures distinct, depressed; wall smooth and glossy; aperture large, with a slight lip and a very large tooth, which in side view projects well above the outline of the chamber and in end view nearly fills the opening.

D'Orbigny's original material of this species was from the coast of Patagonia. It occurs very well developed in the region of the Falklands and also along the Argentine (Patagonian) coast. There are much smaller specimens, which may possibly be variants of this species, from the stations off the coast of Brazil, but the species is only well developed in the colder waters to the south. The peculiar ivory-white color, the glossy surface, and the contour of the chambers will distinguish this species, which is apparently localized about the southern coast of South America.

QUINQUELOCULINA LAEVIGATA d'Orbigny

PLATE 1, FIGURES 5, 6

Quinqueloculina laevigata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 30, 1929.

There are numerous specimens from the stations along the Brazilian coast that are referable to this species, which is a typically West Indian one.

QUINQUELOCULINA COSTATA d'Orbigny

PLATE 1, FIGURES 8 *a–c*

Quinqueloculina costata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 31, 1929.

As might be expected, this species, which is a common West Indian one, occurs only in our material from Rio de Janeiro Harbor, and there it is rather rare.

Genus TRILOCULINA d'Orbigny, 1826

TRILOCULINA CIRCULARIS Bornemann

PLATE 1, FIGURES 12 *a–c*

Triloculina circularis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 58, 1929.

This species, which is very widely distributed, occurs in considerable numbers at the stations off the Falklands and northward along the coast of Rio de Janeiro Harbor.

Genus PYRGO Defrance, 1824

PYRGO SUBSPHAERICA (d'Orbigny)

PLATE 1, FIGURES 13 *a*, *b*

Pyrgo subsphaerica CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 68, 1929.

This species, which is so abundant in shallow water in the West Indian region, appears to be very rare along the coast of South America. There are specimens from Rio de Janeiro Harbor, which may possibly be assigned to it, and also from station 8.

Family OPHTHALMIDIIDAE

Genus CORNUSPIRA Schultze, 1854

CORNUSPIRA INVOLVENS Reuss

PLATE 2, FIGURE 1

Cornuspira involvens CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 80, 1929.

A large proportion of our stations have this species present in few numbers. The only one at which it could be considered common is station 105, Port William, Falklands.

Genus PLANISPIRINA Seguenza, 1880

PLANISPIRINA AURICULATA Egger

PLATE 2, FIGURE 3

Planispirina auriculata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 6, p. 93, 1929.

There is a single specimen, which is like those found in the West Indian region and also in the Indo-Pacific, from station 8. This extends the western-Atlantic range of the species from the region of Beaufort, S. C., on the north, to this station on the south. It is never found apparently in any great numbers in the Atlantic, and its small size also makes it rather easily overlooked.

Family TROCHAMMINIDAE

Genus TROCHAMMINA Parker and Jones, 1860

TROCHAMMINA GLOBIGERINIFORMIS (Parker and Jones)

PLATE 2, FIGURES 4 *a–c*

Trochammina globigeriniformis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 2, p. 78, 1920.

There are numerous specimens that may be referred to this species, but, like the figured one, they are mostly compressed, and while the chambers themselves are more or less globular, the entire test does not have the high spire often characteristic of the species. The figured specimen is from off St. Julian, Argentina, and we have other specimens from the northward at stations 8 and 2.

TROCHAMMINA ROTALIFORMIS J. Wright

PLATE 2, FIGURES 5 *a–c*

Trochammina rotaliformis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 2, p. 77, 1920.

A few specimens similar to that here figured, composed of several coils with four or five chambers in each, are referred to this species. They are from off the Falkland Islands.

TROCHAMMINA PERUVIANA Cushman and Kellett

PLATE 2, FIGURES 7 *a–c*

Trochammina peruviana CUSHMAN and KELLETT, Proc. U. S. Nat. Mus., vol. 75, art. 25, p. 4, pl. 1, figs. 8*a*, *b*, 1929.

Test trochoid, spire greatly flattened, dorsally very slightly convex, ventrally slightly concave, consisting of three or four whorls; chambers numerous, 10 or more in the last-formed whorl, of rather uniform size and shape, increasing slowly in size as added; sutures on

the dorsal side gently curved, very slightly depressed, only those of the last-formed whorl distinct, on the ventral side gently curved or with a sinuous, lobed condition, especially in later portions, distinct; wall finely arenaceous with much chitin, thin, very flexible when wet; aperture ventral, along the margin of the last-formed chamber.

The above description, which is copied from the original, applies equally well to our specimens from station 2, off Ilha Paqueta, Rio de Janeiro Harbor. The peculiar sinuous arrangement of the ventral side is perhaps not quite so marked as in the types from off Peru, but otherwise the specimens agree very well with the types.

Family LAGENIDAE

Genus NODOSARIA Lamarck, 1812

NODOSARIA CALOMORPHA Reuss(?)

PLATE 3, FIGURES 1, 2

Nodosaria calomorpha REUSS, Denkschr. k. Akad. Wiss. Wien, vol. 25, p. 129, pl. 1, figs. 15–19, 1885.

At numerous stations from station 8 southward to the Falklands there occur numerous fragmentary specimens, never consisting of more than three chambers, which may be referred with some question to this species of Reuss. The chambers, as shown in the figured ones, are somewhat longer than broad, and the sides are broadest in the middle. The one with three chambers shows that it comes from a specimen that had at least two other chambers, and it is probable that this does not represent very closely Reuss's species from the Tertiary of Europe, but it is not sufficiently complete for full description. Our specimens are exactly identical with those figured by Brady in the *Challenger* report under this name.

NODOSARIA CATESBYI d'Orbigny

PLATE 3, FIGURES 3, 4

Nodosaria catesbyi D'ORBIGNY, *in* De la Sagra, Hist. Fis. Pol. Nat. Cuba, "Foraminifères," p. 16, pl. 1, figs. 8–10, 1839.—CUSHMAN, Florida State Geol. Surv. Bull. 4, p. 28, pl. 5, fig. 4, 1930.

Nodosaria sp. (?) CUSHMAN, Carnegie Inst. Washington Publ. 311, p. 32, pl. 4, fig. 2, 1922.

Test composed of two chambers, the proloculum subglobular, with a short basal spine, the second chamber more pyriform, apertural end somewhat prolonged; suture distinct and depressed; wall ornamented with numerous, very distinct costae, which extend the entire length of the two chambers to the aperture.

This species, described by d'Orbigny from the West Indian region, has been found to be common in that area, and also is found in the Miocene of Florida. In the present collections it occurred in considerable numbers at station 8 but was not seen elsewhere.

Genus LAGENA Walker and Jacob, 1798

LAGENA ASPERA Reuss

PLATE 3, FIGURE 7

Lagena aspera CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 8, 1923.

This species is rare at station 97, Port William, Falklands.

LAGENA CAUDATA (d'Orbigny)

PLATE 3, FIGURE 9

Oolina caudata D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminifères," p. 19, pl. 5, fig. 6, 1839.

Lagena caudata REUSS, Sitz. k. Akad. Wiss. Wien, vol. 46, pt. 1, p. 325, pl. 6, fig. 29, 1862.

D'Orbigny's original specimens came from the Falkland Islands and the coast of Patagonia. His figure shows a pyriform specimen with numerous costae and with the base ending in a definite spine. Our figured specimen, which is from station 8 off the South American coast, resembles d' Orbigny's in the longitudinal costae and the basal spine, but the shape of the test is quite different. This is the only material in the collection that at all approaches this species.

LAGENA PERLUCIDA (Montagu)

PLATE 3, FIGURE 6

Lagena perlucida CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 46, 1923.

This is by far the commonest species of the genus in the present collections, occurring in considerable numbers at Port Stanley, Falklands, and as scattered specimens at other stations in that region, as well as stations 8 and 2 to the northward. As usual there is considerable variation in the shape and costae in this species.

LAGENA LYELLI (Seguenza)

PLATE 3, FIGURE 8

Lagena lyelli CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 34, 1923.

At station 8 there are numerous specimens of the form here figured that may be referred to Seguenza's species. There is a slight basal

spine. The main body of the test is globular, and there are a few faint, longitudinal costae.

LAGENA VILARDEBOANA (d'Orbigny)

PLATE 3, FIGURE 5

Oolina vilardeboana D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminifères," p. 19, pl. 5, figs. 4, 5, 1839.

Lagena vilardeboana REUSS, Sitz. k. Akad. Wiss. Wien, vol. 46, pt. 1, p. 329, pl. 4, fig. 53, 1862.

The types of this species were described by d'Orbigny from the Falkland Islands. His figures show a single chamber with very strong, longitudinal costae, very similar to those in our figure. These costae are blunt as shown in his partial section. In our specimens there seem to be distinct and rather coarse perforations between the costae. These are referred to d'Orbigny's species and are from the Falklands at Port William.

LAGENA MELO (d'Orbigny)

Lagena melo CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 38, 1923.

D'Orbigny originally described this species from the Falkland Islands, and we have specimens both from the Falklands from Port William, and from station 123, St. Julian, Argentina, which are exactly like the figured specimens given by d'Orbigny. Most of the figured forms referred to this species are not typical, and many of them seem best referred to Williamson's species, which he figured from off the British Isles. It may be possible that the typical *Lagena melo* is only to be found in the vicinity of the Falklands and the southern part of South America.

Family POLYMORPHINIDAE

Genus GUTTULINA d'Orbigny, 1826

GUTTULINA LACTEA (Walker and Jacob)

PLATE 3, FIGURES 10, 11

Guttulina lactea CUSHMAN and OZAWA, Proc. U. S. Nat. Mus., vol. 77, art. 6, p. 43, 1930.

There are a few specimens from Rio de Janeiro Harbor, adult and young of which are figured here. These seem to correspond closely with the typical form of the species, which is widely distributed in the present oceans.

Family NONIONIDAE

Genus NONION Montfort, 1808

NONION GRATELOUPI (d'Orbigny)

PLATE 2, FIGURES 6 *a*, *b*

Nonion grateloupi CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 10, 1930.

There are numerous specimens of this West Indian species from the three stations in Rio de Janeiro Harbor, but it has not occurred in any of the material from the region to the south.

Genus ELPHIDIUM Montfort, 1808

ELPHIDIUM POEYANUM (d'Orbigny)

Elphidium poeyanum CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 25, 1930.

This species is the most abundant one in the West Indian region, and it is therefore not surprising to find that it is common at all three of the stations in Rio de Janeiro Harbor. These specimens are typical and show the very prominently perforate wall and the short retral processes. It seems to be replaced in the colder water to the south by the following species.

ELPHIDIUM ARTICULATUM (d'Orbigny)

Elphidium articulatum CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 26, 1930.

D'Orbigny described this species from "the coast of Patagonia, near Rio Negro, and also from the Falklands." It is fairly common off the Falklands in shallow water and also occurs off St. Julian, Argentina, and off Puerto Deseado, Argentina. These stations correspond exactly with the distribution of the species as given by d'Orbigny. This may be distinguished from *E. poeyanum* by the highly polished and very finely perforate wall, the perforations being so small that the wall appears entirely clear in many specimens.

ELPHIDIUM INCERTUM (Williamson)

Elphidium incertum CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 18, 1930.

A very few specimens in the collections from South America may be referred to Williamson's species. They are not typical, however, and possibly may have to be referred elsewhere.

ELPHIDIUM SAGRUM (d'Orbigny)

Elphidium sagrum CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 24, 1930.

The only specimen that can be referred to this West Indian species is a single one from Rio de Janeiro Harbor. This specimen is typical,

however, in its general form and in the heavy, somewhat costate, appearance of the early part of the last-formed coil. So far as the examination of West Indian material shows, this species is never an abundant one, but is nevertheless widely distributed in this warmer area of the western Atlantic.

ELPHIDIUM LESSONII (d'Orbigny)

Elphidium lessonii CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 22, 1930.

This is one of the finest species of the genus, very abundant and well developed in the general region of the Falklands, occurring at Port William, Port Stanley, and Port Howard. There are also typical specimens from Puerto Deseado, Argentina. D'Orbigny's original type locality is given as the "coast of Patagonia, to the south of Rio Negro." His type specimen was not apparently a completely adult form, but represents a young stage frequently seen with the others in our collections. In the adult form this is a very beautifully sculptured species and can hardly be confused with any other one of the genus. So far as is known it is limited to the general region of the Falklands and southern South America. It may be noted that Brady's figure in the *Challenger* report (pl. 110, fig. 9) is probably this species. This particular figured specimen was from the Falklands.

ELPHIDIUM OWENIANUM (d'Orbigny)

Elphidium owenianum CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 21, 1930.

D'Orbigny described this species from off the "coast of Patagonia, to the south of Rio Negro." It may be distinguished from the others of the region by the thickening of the umbilical region, very distinct sutures, and the subacute margin. We have specimens from the Falklands at Port Howard and Port William, and it also occurs off Puerto Deseado, Argentina. It is not nearly so common as the preceding species.

ELPHIDIUM cf. ADVENUM (Cushman)

Elphidium cf. *advenum* CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 25, 1930.

The only specimens that can be referred to this species occur in the warm water of Rio de Janeiro Harbor. This species is typically a warm-water one of the West Indies and occurs also as far back as the Miocene of the Florida region. Some of the specimens of the following species somewhat resemble this, but the umbonal portion of *E. advenum* is very distinct, with a definite boss in its typical form, whereas the central region of *E. alvarezianum* is excavated and without any central boss.

ELPHIDIUM ALVAREZIANUM (d'Orbigny)

Elphidium alvarezianum, CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 7, p. 18, 1930.

This is one of the distinctive species of the Falklands and southern South America, recorded from both regions by d'Orbigny in his original description. Besides the typical form the following variety occurs in the region of the Falklands:

ELPHIDIUM ALVAREZIANUM (d'Orbigny) SERRULATUM, new variety

PLATE 2, FIGURES 9 *a*, *b*

Variety differing from the typical in the character of the periphery, which has definite toothlike projections, in the extreme form having each projection opposite the chambers divided into numerous serrations. Specimens connecting this variety with the typical form occur in which the spinose projections are simple.

Holotype of variety (U.S.N.M. No. 21932) from station 97, Port William, Falkland Islands, collected by Dr. Waldo L. Schmitt.

In its fully developed form this is a very beautiful variety and unlike any other form known to us. It is, however, very definitely related to d'Orbigny's species.

ELPHIDIUM AUSTRALIS, new species

PLATE 2, FIGURES 8 *a*, *b*

Test planispiral, nearly completely involute, the periphery very broadly rounded, and in the last-formed portion almost truncate; chambers very distinct, 12 to 15 in the last-formed coil, of nearly uniform shape and increasing only slightly in size as added; sutures deep, very distinct; retral processes very short and often inconspicuous; wall of the main body of the chamber smooth except in the early portion of the last-formed coil, where it is often roughened by small papillae arranged more or less in longitudinal lines in the plane of coiling, unbonal region also strongly papillate; aperture consisting of numerous small circular pores at the base of the apertural face, which is smooth, with a distinct border about its periphery. Diameter, 0.5–0.6 mm.; thickness, 0.25 mm.

Holotype (U.S.N.M. No. 21933) from station 80, Port Stanley, Falkland Islands, collected by Dr. Waldo L. Schmitt.

This species was common at the type station but did not occur at any of the other stations in the entire collection. It is a very distinct and unmistakable species and apparently of very limited distribution.

Family BULIMINIDAE

Genus BULIMINELLA Cushman, 1911

BULIMINELLA ELEGANTISSIMA (d'Orbigny)

PLATE 3, FIGURES 12, 13

Bulimina elegantissima D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, no. 5, "Foraminifères," p. 51, pl. 7, figs. 13, 14, 1839.—SCHLUMBERGER, Feuille Jeun. Nat., vol. 12, p. 8, pl. 1, fig. 14, 1882.—H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 402, pl. 50, figs. 20–22, 1884.—SIDEBOTTOM, Mem. Proc. Manchester Lit. Philos. Soc., vol. 49, no. 5, p. 11, pl. 2, fig. 6, 1905.

Buliminella elegantissima CUSHMAN, U. S. Nat. Mus. Bull. 71, pt. 2, p. 89, 1911; Proc. U. S. Nat. Mus., vol. 56, p. 606, 1919; Contr. Cushman Lab. Foram. Res., vol. 1, pt. 2, p. 40, pl. 6, figs. 5 *a*, *b*, 1925.—CUSHMAN and KELLETT, Proc. U. S. Nat. Mus., vol. 75, art. 25, p. 6, pl. 3, figs.1–3, 1929.—CUSHMAN, Florida State Geol. Surv. Bull. 4, p. 42, pl. 8, figs. 2, 3, 1930.

Test elongate, spiral, making about three volutions, initial end pointed, much more so in the microspheric form; chambers numerous, 7 to 10 in the last-formed whorl, narrow, slightly inflated; sutures distinct, slightly curved, very slightly depressed; wall smooth, finely perforate; aperture elongate, narrow, somewhat enlarged toward the middle of the apertural face.

This has proved to be one of the most abundant species in the collection, originally described from the west coast of South America, where it is also very abundant. Its range includes the Falklands and the coast of South America northward as far as our material covers, to Rio de Janeiro Harbor, where it also occurs in typical form. Its fossil range goes back at least to the Miocene of Florida, where it is extremely common in the Choctawhatchee marl at numerous localities. Many other things have been included by various authors in this species, but in its typical form it does not seem to show any great degree of variation.

BULIMINELLA PARALLELA, new species

PLATE 3, FIGURES 15 *a–c*

Test elongate, the sides usually nearly parallel for most of their length, both ends broadly rounded, nearly circular in transverse section; chambers distinct, in three or more whorls, the spiral suture being somewhat irregularly crenulate, several chambers, five or more, in each whorl, not much if at all inflated; sutures distinct, slightly limbate, flush with the surface; wall smooth and polished, very finely perforate; aperture rounded with very slightly raised costae running in toward it on the surrounding depressed area. Length, 0.25 mm.; breadth, 0.08–0.1 mm.

Holotype (U.S.N.M. No. 21934) from station 2 off Ilha Paqueta, Rio de Janeiro Harbor, collected by Dr. Waldo L. Schmitt.

This species has been referred to *B. elegantissima* by some authors and is closely related to the form described by Millett from the Malay Archipelago, as *B. elegantissima* var. *compressa*. The form that Millett assigns to *B. elegantissima* is also very close to our species.

Genus BULIMINA d'Orbigny, 1826

BULIMINA PATAGONICA d'Orbigny

PLATE 3, FIGURE 14

Bulimina patagonica D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminifères," p. 50, pl. 1, figs. 8, 9, 1839.—CUSHMAN and WICKENDEN, Proc. U. S. Nat. Mus., vol. 75, p. 8, pl. 3, figs. 11 *a*, *b*, 1929.—CUSHMAN and KELLETT, Proc. U. S. Nat. Mus., vol. 75, art. 25, p. 7, pl. 3, figs. 4 *a*, *b*, 1929.

There are a very few specimens that seem to be the same as that described by d'Orbigny and that have been recorded in the above references from the west coast of South America. The specimens we have, one of which is here figured, show the irregularity of the last-formed chambers, very similar to the type specimen figured by d'Orbigny. This seems to be a characteristic feature of the species.

BULIMINA MARGINATA d'Orbigny

Bulimina marginata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 91, 1922.

There are a few specimens, all from the three stations in Rio de Janeiro Harbor, that seem best referred to this species. They have the small teeth along the margin definitely at the margin and not above it, as in d'Orbigny's *B. pulchella*.

Genus ENTOSOLENIA Ehrenberg, 1848

ENTOSOLENIA COMPRESSA (d'Orbigny)

PLATE 3, FIGURE 16

Oolina compressa D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminifères," p. 19, pl. 5, figs. 1, 2, 1839.

Under this specific name d'Orbigny described a compressed *Lagena*-like form from the Falklands and the coast of Patagonia. He noted that it is very rare. We have a very similar form, in which the periphery has a blunt, thickened keel and there is a definite internal tube, placing this species in *Entosolenia*. Our specimens were from the Falklands at Port Howard and Port William.

ENTOSOLENIA IOTA (Cushman) (?)

PLATE 3, FIGURE 17

Entosolenia iota CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 27, 1923.

A very few specimens from the Falklands have a peculiar curved thickness resembling very much the species described under this specific name from the North Atlantic. The shape, however, is not exactly the same, and it may be found not to be this species when further material is available.

ENTOSOLENIA sp. (?)

PLATE 3, FIGURE 18

A figure is given showing the peculiar small species with an internal tube, which has a very broad aperture with a decided short neck and phialine lip. It is figured here for future reference.

Genus VIRGULINA d'Orbigny, 1826

VIRGULINA PUNCTATA d'Orbigny

Virgulina punctata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 117, 1922.

Very rare specimens, which are identical with this species so common in the general West Indian region, occur at all three of the stations in Rio de Janeiro Harbor.

There are single specimens from three stations off the Falklands which represent species belonging to this genus, but they are evidently the young stages, and therefore are not specifically determinable.

Genus BOLIVINA d'Orbigny, 1839

BOLIVINA PULCHELLA (d'Orbigny)

PLATE 3, FIGURE 20

Bolivina pulchella CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 41, 1922.

There are a few very typical specimens of this species from two of the stations in Rio de Janeiro Harbor. This is, however, a typically West Indian species confined to this region of the western Atlantic.

BOLIVINA PLICATELLA Cushman

PLATE 3, FIGURE 19

Bolivina plicatella CUSHMAN, Florida State Geol. Surv. Bull. 4, p. 46, pl. 8, figs. 10 *a*, *b*, 1930.

Test small, short and broad, compressed, greatest width near the apertural end, periphery subacute; chambers, except the last two, obscured by the ornamentation, which also obscures the sutures; wall

ornamented by two distinct longitudinal ridges, rounded or sharp, connected between with transverse ridges, coinciding partially with the chambers, leaving the whole surface broken into series of irregular depressions, coarsely perforate; aperture elongate.

This species, recently described from the Miocene of the Choctawhatchee marl of Florida, occurs also living in the West Indian region, and specimens occur as far south as the Falklands, including Rio de Janeiro Harbor and the coast of Argentina.

Heron-Allen and Earland have given a new name to a closely related form that occurs off the coast of Europe. Both of these species have been for a long time classed with d'Orbigny's *B. plicata*, which is a very different species occurring off the western coasts of North and South America.

BOLIVINA STRIATULA Cushman

PLATE 3, FIGURES 21 *a*, *b*

Bolivina striatula CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 43, 1922.

Like many others of the typical West Indian species, this one occurs in considerable numbers at all three stations in Rio de Janeiro Harbor, but nowhere else in the collections to the southward. Specimens are well developed and typical.

BOLIVINA TORTUOSA H. B. Brady

PLATE 3, FIGURES 22 *a*, *b*

Bolivina tortuosa CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 49, 1922.

There are two specimens of this species from one of the stations in Rio de Janeiro Harbor. Neither of these is apparently an adult specimen, but they resemble the Atlantic form of the species much more than the Pacific one.

BOLIVINA sp.(?)

PLATE 3, FIGURES 23 *a*, *b*

The figured specimen shows a peculiar small species, which occurred rarely in the material from Rio de Janeiro Harbor, and without a larger series it can not be definitely assigned a specific name.

Genus LOXOSTOMUM Ehrenberg, 1854

LOXOSTOMUM MAYORI (Cushman)

PLATE 3, FIGURE 24

Bolivina mayori CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 40, 1922.

Very excellent and typical specimens of this species occur in considerable numbers in the collection from Rio de Janeiro Harbor.

It is a characteristic West Indian species, and some of the Brazilian specimens reach a size nearly as great as that of those specimens found off the Tortugas, Fla., the type locality. The last chambers have the aperture terminal and show a tendency toward becoming uniserial, characters that place this species in the genus *Loxostomum*.

Genus SIPHOGENERINA Schlumberger, 1883

SIPHOGENERINA cf. RAPHANUS (Parker and Jones)

PLATE 3, FIGURES 25, 26

Siphogenerina cf. *raphanus* CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 174, 1923.

The Atlantic material of this species is never so well developed as is that form found in the Indo-Pacific. Forms assigned to this species occur rarely in the West Indian region, and there are a few specimens from all three of the stations in Rio de Janeiro Harbor. The aperture is always large, and there is no definite neck produced as in the Indo-Pacific form. The costae are limited to the early portion of the test as a rule and are not so well developed as in the typical form.

Genus ANGULOGERINA Cushman, 1927

ANGULOGERINA OCCIDENTALIS (Cushman)

Uvigerina angulosa CUSHMAN (not Williamson), Carnegie Inst. Washington Publ. 311, p. 34, pl. 5, figs. 3, 4, 1922.
Uvigerina occidentalis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 4, p. 169, 1923.
Angulogerina occidentalis (CUSHMAN), Florida State Geol. Surv. Bull. 4, p. 50, pl. 9, figs. 8, 9, 1930.

Test minute, elongate, triangular in transverse section, the periphery somewhat lobulate; chambers distinct, those of the last-formed portion becoming more distinct and remote; sutures distinct and depressed; wall ornamented with longitudinal costae on all but the last-formed chambers in the adult; apertural end drawn out into a short tubular neck and slight phialine lip.

This species is known from the Miocene of the Florida region, and also is living in the general West Indian area. Our material shows it to be present at all three of the stations in Rio de Janeiro Harbor, but its range does not extend to the collections made to the southward.

Family ROTALIIDAE

Genus SPIRILLINA Ehrenberg, 1841

SPIRILLINA VIVIPARA Ehrenberg var. DENSEPUNCTATA Cushman

PLATE 4, FIGURES 1 *a–c*

Spirillina vivipara var. *densepunctata* CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 4, 5, 1931.

Figures are given of this somewhat trochoid form recently described from Porto Rico. The few specimens in our material came from the stations in Rio de Janeiro Harbor, showing that this variety is probably to be found throughout the general West Indian area. The perforations are usually numerous and closely placed, and in spite of being a planispiral form, there is a tendency for it to become trochoid.

Genus PATELLINA Williamson, 1858

PATELLINA CORRUGATA Williamson

PLATE 4, FIGURE 2

Patellina corrugata CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 11, 12, 1931.

Specimens that seem to be identical with those described by Williamson and others from off Great Britain occur in the material from Port William, Falklands. They have, as is shown in the figure, a low spire and coarse divisions of the chambers. They do not occur in the warmer water to the northward.

PATELLINA ADVENA Cushman

PLATE 4, FIGURE 3

Patellina advena CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, p. 13, 1931.

Typical specimens with the very finely divided chambers and rather high spire occur in two of the lots of material from Rio de Janeiro Harbor. The appearance of these two species under the microscope is very distinct, and their distribution is apparently equally distinctive, *P. advena* being a warmer water species, while *P. corrugata* is known only from cold waters.

Genus DISCORBIS Lamarck, 1804

DISCORBIS FLORIDANA Cushman

PLATE 4, FIGURES 5 *a–c*

Discorbis floridana CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 21, 22, 1931.

A few specimens, which seem to be identical with this species, occur at the various stations in Rio de Janeiro Harbor. One of the

small specimens is here figured, which, although not quite typical, is probably to be assigned to this species.

DISCORBIS MIRA Cushman

Discorbis mira CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 25, 26, 1931.

A very few but very typical specimens occur in Rio de Janeiro Harbor. As this is typically a West Indian species, it would not be expected in the colder-water material.

DISCORBIS CANDEIANA (d'Orbigny)

Discorbis candeiana CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, p. 19, 1931.

There are rare specimens of this species described by d'Orbigny from the West Indies occurring with the preceding species.

DISCORBIS NITIDA (Williamson)

PLATE 4, FIGURES 4 *a–c*

Discorbis nitida CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 26, 27, 1931.

The figured specimen shows a typical specimen of a form that is here assigned to Williamson's species. It shows some differences, in that our form usually has fewer chambers, and the ventral portion has a somewhat more lobed appearance. Otherwise, however, it seems to be very close to this species as developed off the British Isles, and a comparison of specimens from the two areas shows very little difference, except in the points noted. Our specimens are most abundant at the three stations in Rio de Janeiro Harbor, but somewhat similar ones occur at Port William in the Falklands, this being one of the few forms which occurs in the two areas.

Genus EPONIDES Montfort, 1808

EPONIDES PERUVIANUS (d'Orbigny)

Rosalina peruviana D'ORBIGNY, Voyage dans l'Amérique Méridionale, vol. 5, pt. 5, "Foraminifères," p. 35, pl. 2, figs. 3–5, 1839.

Eponides peruviana CUSHMAN and KELLETT, Proc. U. S. Nat. Mus., vol. 75, art. 25, p. 10, pl. 4, figs. 5*a–c*, 1929.

Test trochoid, nearly equally biconvex, periphery carinate, generally circular in outline; chambers numerous, distinct, about eight in the last-formed whorl, on the dorsal side forming a very even, polished surface, ventrally inflated, giving a very distinct appearance to the test; sutures very distinct on the dorsal side, curved, flush with the surface, slightly limbate, on the ventral side radial, depressed; wall smooth, very finely perforate; aperture ventral, at the base of the chamber between the periphery and the umbilicus.

The original material of d'Orbigny came from the west coast of South America, and apparently has a wide distribution along that coast. A comparison of material from Chile and Peru, described in the above reference, with the abundant material from along the coast of South America and the Falklands, seems to show that they are the same. D'Orbigny's *Rotalina patagonica* shows no trace of the granulations in the sutures, but in the general form and appearance it is very similar to much of the material occurring at the Falklands and off the coast of Argentina, as well as northward at Rivadavia, Brazil. D'Orbigny's figure of *E. peruviana* shows a form with more numerous chambers and an acute periphery, the chambers on the dorsal side limbate and on the ventral side radial and straight. An examination of a great many specimens from both sides of South America leaves one somewhat confused as to the name that should be applied to these specimens. There seem to be gradations between them in several respects. Many of the specimens from the Falklands, for instance, have the same number of chambers and a rounded periphery similar to d'Orbigny's "*patagonica*," but the sutures are always practically radial, have a distinct depressed area, which is finely granular, and frequently have along the periphery a distinct, thickened, keel-like appearance. Probably the only way to finally determine the status of these two species is to examine the type specimens in the original d'Orbigny collection.

Genus ROTALIA Lamarck, 1804

ROTALIA BECCARII (Linnaeus) var. PARKINSONIANA (d'Orbigny)

Rosalina parkinsoniana d'Orbigny, Hist. Fis. Pol. Nat. Cuba, "Foraminifères," p. 99, pl. 4, figs. 25–27, 1839.

Rotalia beccarii (Linnaeus) var. *parkinsoniana* (d'Orbigny), Cushman and Cole, Contr. Cushman Lab. Foram. Res., vol. 6, p. 100, pl. 13, figs. 14 *a–c*, 1930.

In the West Indian region there is a distinctive form of *Rotalia* to which d'Orbigny gave the specific name "*parkinsoniana*." This is apparently living, widely spread in the general West Indian region, and from our material extends southward as far as Rio de Janeiro Harbor, where it is common at all three stations. The same form has been recorded in the above reference from the Pleistocene of Maryland.

Genus CANCRIS Montfort, 1808

CANCRIS SAGRA (d'Orbigny)

Cancris sagra Cushman, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 74, 75, 1931.

There are numerous, very typical specimens of this West Indian species from all the stations in Rio de Janeiro Harbor. The series

shows the same general variation of form that is seen in West Indian material and also in that from the Miocene of both Florida and California.

Genus SIPHONINA Reuss, 1849

SIPHONINA PULCHRA Cushman

Siphonina pulchra CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, p. 69, 1931.

There were two specimens of this species noted occurring in one of the stations in Rio de Janeiro Harbor.

Family CASSIDULINIDAE

Genus PULVINULINELLA Cushman, 1926

PULVINULINELLA EXIGUA (H. B. Brady)

Pulvinulina exigua H. B. BRADY, Rep. Voy. *Challenger*, Zoology, vol. 9, p. 696, pl. 103, figs. 13, 14, 1884.

Brady's small species evidently belongs to the genus *Pulvinulinella*. Its aperture is in the plane of coiling and is elongate. It is interesting to find that the two figured specimens in the *Challenger* report are one from the South Atlantic and the other marked "Southern Ocean." We have numerous specimens of very small size, comparing very well with Brady's figures, from several stations in the Falkland Islands.

Genus CASSIDULINA d'Orbigny, 1826

CASSIDULINA CRASSA d'Orbigny

PLATE 4, FIGURES 6 *a*, *b*

Cassidulina crassa CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 3, p. 124, 1922.

D'Orbigny's types of this species came from the general region of our collections, and very typical specimens occur in the material from Port William, Falkland Islands. We have also other specimens that are very similar, and perhaps identical, from the stations in Rio de Janeiro Harbor. There are no sizable specimens present in any of the collections, but from Earland we have received some very fine large specimens of this same general form from off the Falklands in deeper water.

Genus CASSIDULINOIDES Cushman, 1927

CASSIDULINOIDES PARKERIANA (H. B. Brady)

PLATE 4, FIGURES 7 *a*, *b*

Cassidulina parkeriana H. B. BRADY, Quart. Journ. Micr. Sci., vol. 21, p. 59, 1881; Rep. Voy. *Challenger*, Zoology, vol. 9, p. 432, pl. 54, figs. 11–16, 1884.

All three of the *Challenger* stations from which Brady had this species are "amongst the islands on the west coast of Patagonia." These stations are in much deeper water than is represented by our material. We have very typical specimens from Port William, Falkland Islands, but comparatively rare.

Family ANOMALINIDAE

Genus CIBICIDES Montfort, 1808

CIBICIDES ROBERTSONIANA (H. B. Brady)

Cibicides robertsoniana CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 121, 122, 1931.

Very rare specimens showing the typical color and form of this species occurred in material from Rio de Janeiro Harbor. There are other records for the species from off the coast of Brazil. It was found in the *Albatross* dredgings from the western Atlantic, and seems to be a very distinct species of that part of the world.

CIBICIDES CONCENTRICUS (Cushman)

Cibicides concentricus CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 120, 121, 1931.

This is one of the species originally described from the Miocene of Florida, and later has been found to be fairly common, living off the Florida coast and elsewhere in the West Indian region. A few typical specimens occurred at station 8 in Rio de Janeiro Harbor, thus extending very much to the southward the known range of this species.

Genus DYOCIBICIDES Cushman and Valentine, 1930

DYOCIBICIDES BISERIALIS Cushman and Valentine

PLATE 4, FIGURE 8

Dyocibicides biserialis CUSHMAN, U. S. Nat. Mus. Bull. 104, pt. 8, pp. 126, 127, 1931.

All stages from the coiled young to the biserial adult were found in the material from Port William. One of these is figured. It has not, however, occurred at any of the other stations as far as we have noted.

EXPLANATION OF PLATES

Plate 1

Figure 1. *Proteonina difflugiformis* (H. B. Brady), ×60.

2. *Glomospira gordialis* (Jones and Parker), ×60.

3. *Tolypammina vagans* (H. B. Brady), ×40.

4 *a, b*. *Haplophragmoides canariensis* (d'Orbigny), ×60. *a*, Side view; *b*, peripheral view.

5, 6. *Quinqueloculina laevigata* d'Orbigny. *a*, *a*, *b*, *b*, Opposite sides; *c*, apertural view. Fig. 5, ×70. Fig. 6, ×150.

7 *a–c*. *Quinqueloculina lamarckiana* d'Orbigny, ×40. *a*, *b*, Opposite sides; *c*, apertural view.

8 *a–c*. *Quinqueloculina costata* d'Orbigny, ×70. *a*, *b*, Opposite sides; *c*, apertural view.

9 *a–c*. *Quinqueloculina fusca* H. B. Brady, ×70. *a*, *b*, Opposite sides; *c*, apertural view.

10 *a–c*. *Quinqueloculina candeiana* d'Orbigny, ×70. *a*, *b*, Opposite sides; *c*, apertural view.

11 *a–c*. *Quinqueloculina isabellei* d'Orbigny, ×40. *a*, *b*, Opposite sides; *c*, apertural view.

12 *a–c*. *Triloculina circularis* Bornemann, ×50. *a*, *b*, Opposite sides; *c*, apertural view.

13 *a, b*. *Pyrgo subsphaerica* (d'Orbigny), ×50. *a*, Front view; *b*, apertural view.

Plate 2

Figure 1. *Cornuspira involvens* Reuss, ×70.

2 *a–c*. *Quinqueloculina isabellei* d'Orbigny, ×40. *a*, *b*, Opposite sides; *c*, apertural view.

3. *Planispirina auriculata* Egger, ×70.

4 *a–c*. *Trochammina globigeriniformis* (Parker and Jones), ×60. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.

5 *a–c*. *Trochammina rotaliformis* J. Wright, ×70. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.

6 *a, b*. *Nonion grateloupi* (d'Orbigny), ×100. *a*, Side view; *b*, peripheral view.

7 *a–c*. *Trochammina peruviana* Cushman and Kellett, ×150. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.

8 *a, b*. *Elphidium australis*, new species, ×60. *a*, Side view; *b*, peripheral view.

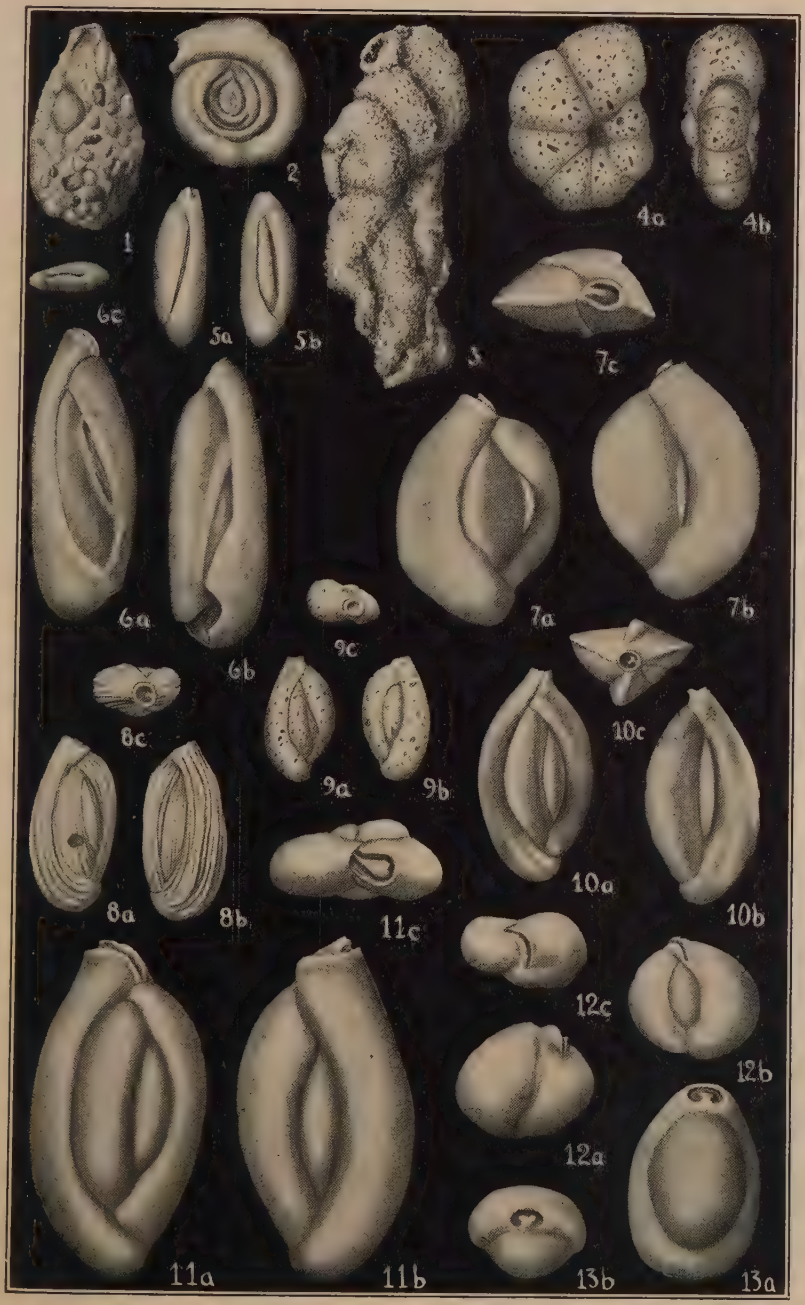
9 *a, b*. *Elphidium alvarezianum* (d'Orbigny) *serrulatum*, new variety, ×60. *a*, Side view; *b*, peripheral view.

PLATE 3

FIGURES 1, 2. *Nodosaria calomorpha* Reuss (?), ×70.
3, 4. *Nodosaria catesbyi* d'Orbigny, ×70.
5. *Lagena vilardeboana* (d'Orbigny), ×70.
6. *Lagena perlucida* (Montagu), ×100.
7. *Lagena aspera* Reuss, ×70.
8. *Lagena lyelli* (Seguenza), ×70.
9. *Lagena caudata* (d'Orbigny), ×70.
10, 11. *Guttulina lactea* (Walker and Jacob), ×70. Fig. 10, Early stage. Fig. 11, Adult.
12, 13. *Buliminella elegantissima* (d'Orbigny), ×120.
14. *Bulimina patagonica* d'Orbigny, ×70.
15 *a–c*. *Buliminella parallela*, new species, ×150. *a*, *c*, Opposite sides; *b*, apertural view.
16. *Entosolenia compressa* (d'Orbigny), ×70.
17. *Entosolenia iota* (Cushman) (?), ×70.
18. *Entosolenia* sp. (?), ×70.
19. *Bolivina plicatella* Cushman, ×70.
20. *Bolivina pulchella* (d'Orbigny), ×70.
21 *a*, *b*. *Bolivina striatula* Cushman, ×150. *a*, Front view; *b*, apertural view.
22 *a*, *b*. *Bolivina tortuosa* H. B. Brady, ×150. *a*, Front view; *b*, apertural view.
23 *a*, *b*. *Bolivina* sp. (?), ×150. *a*, Front view; *b*, apertural view.
24. *Loxostomum mayori* (Cushman), ×50.
25, 26. *Siphogenerina* cf. *raphanus* (Parker and Jones), ×60. *a*, *a*, Side views; *b*, *b*, apertural views.

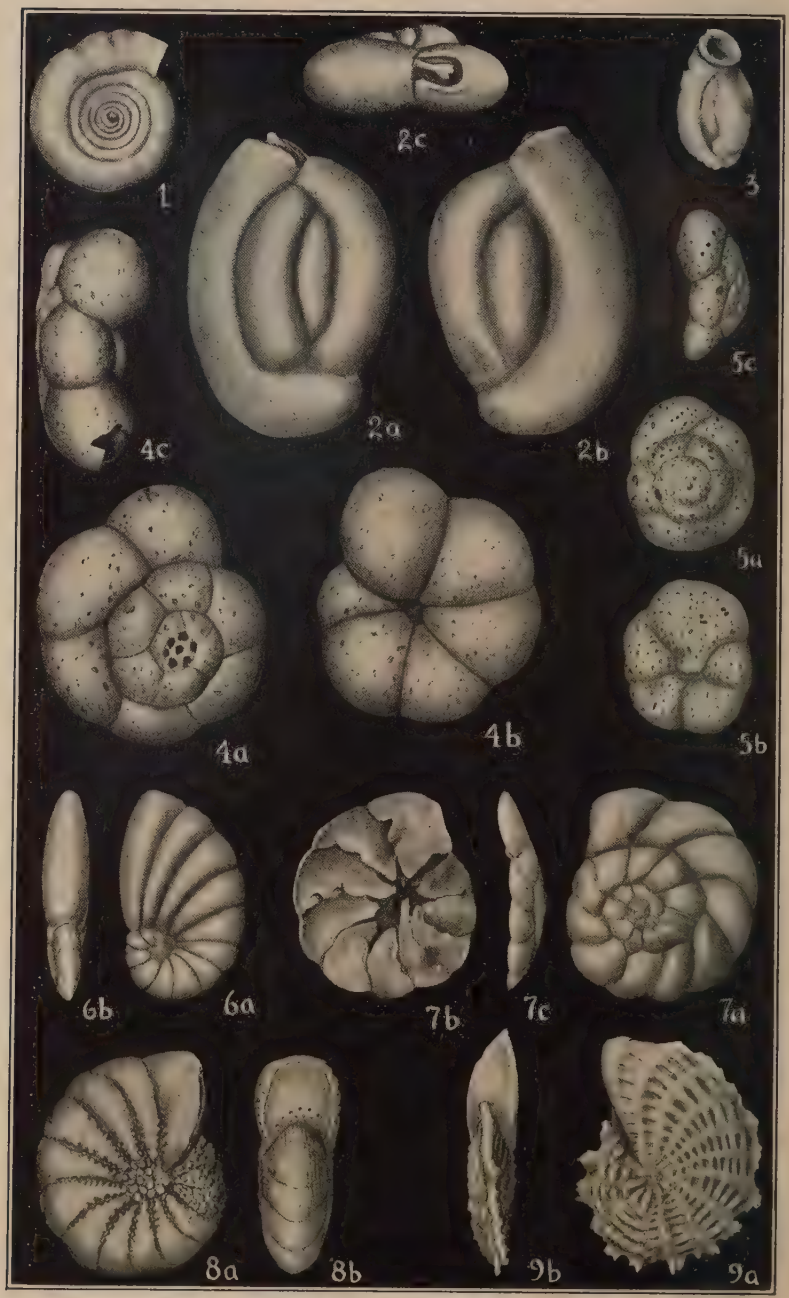
PLATE 4

FIGURES 1 *a–c*. *Spirillina vivipara* Ehrenberg var. *densepunctata* Cushman, ×120. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.
2. *Patellina corrugata* Williamson, ×150.
3. *Patellina advena* Cushman, ×150.
4 *a–c*. *Discorbis nitida* (Williamson) (?), ×120. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.
5 *a–c*. *Discorbis floridana* Cushman, ×100. *a*, Dorsal view; *b*, ventral view; *c*, peripheral view.
6 *a*, *b*. *Cassidulina crassa* d'Orbigny, ×100. *a*, Side view; *b*, peripheral view.
7 *a*, *b*. *Cassidulinoides parkeriana* (H. B. Brady), ×70. *a*, Side view; *b*, peripheral view.
8. *Dyocibicides biserialis* Cushman and Valentine, ×70.



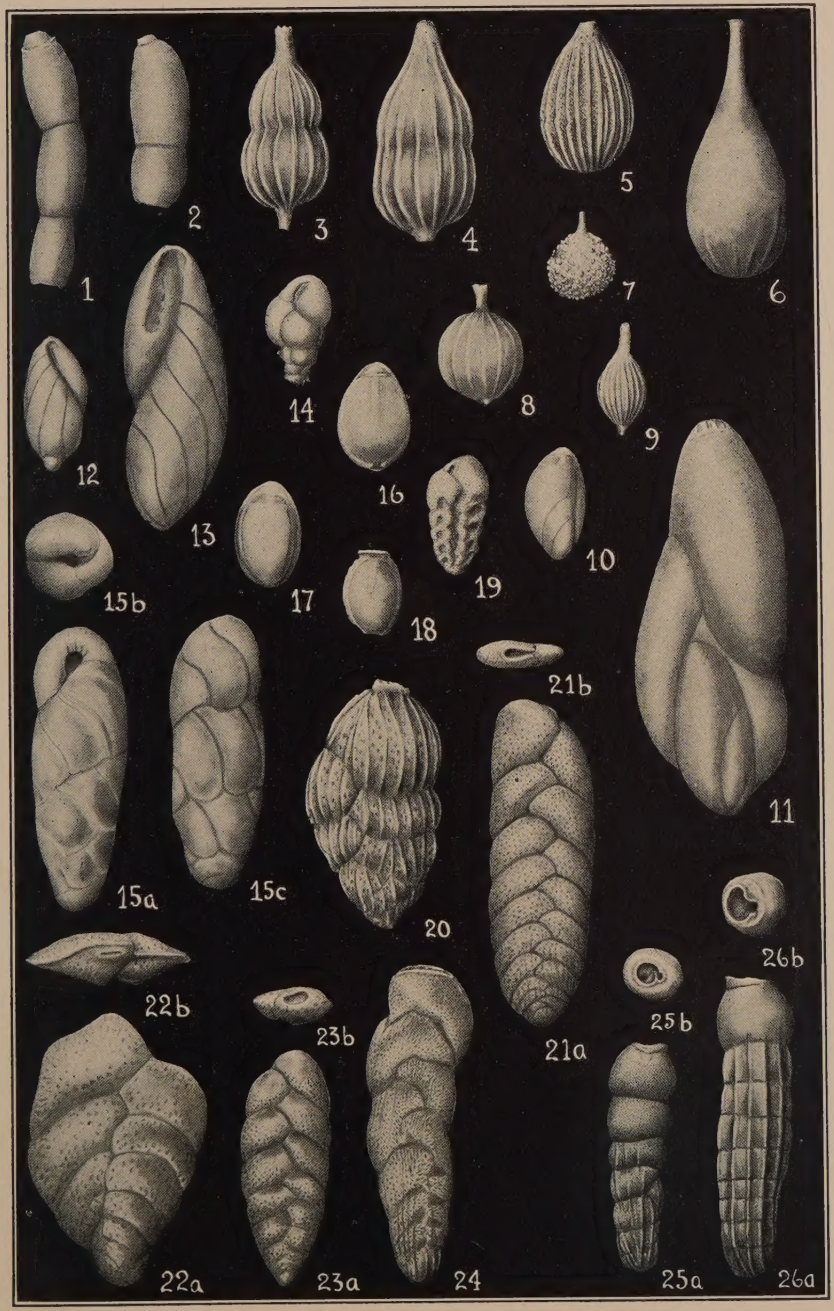
RECENT ATLANTIC FORAMINIFERA FROM SOUTH AMERICA

FOR EXPLANATION OF PLATE SEE PAGE 23.



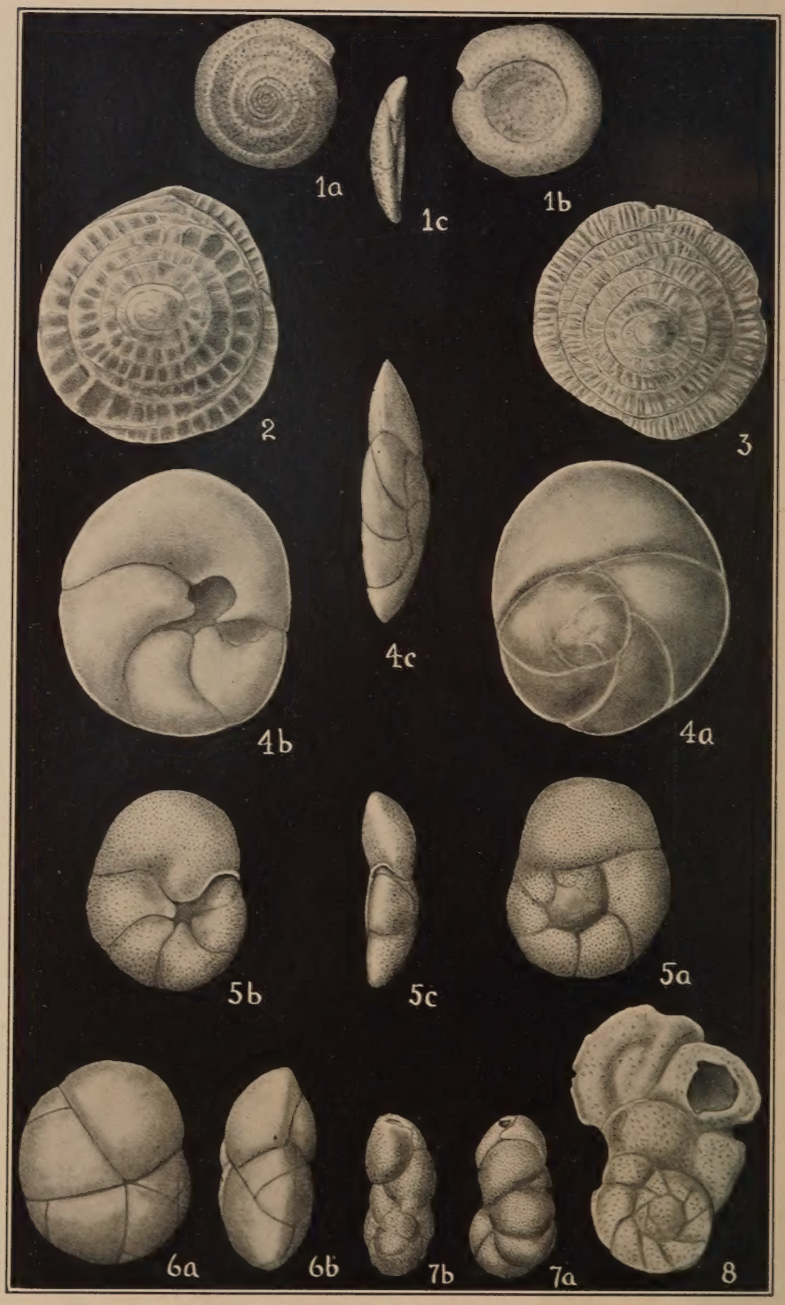
RECENT ATLANTIC FORAMINIFERA FROM SOUTH AMERICA

FOR EXPLANATION OF PLATE SEE PAGE 23.



RECENT ATLANTIC FORAMINIFERA FROM SOUTH AMERICA

FOR EXPLANATION OF PLATE SEE PAGE 24.



RECENT ATLANTIC FORAMINIFERA FROM SOUTH AMERICA

FOR EXPLANATION OF PLATE SEE PAGE 24.